

### DETAILED ACTION

1. Applicant's Remarks filed 02/12/2010 in response to the Office action dated: 08/11/2009 is noted.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Letechin (WO 02/14412 A1) ("Letechin") in view of Wright (US Patent 4,569,749) ("Wright") and Guffey et al (US Patent 5,753,086) ("Guffey").

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4. With respect to claims 2-4, Letechin discloses a method for recycling organic polymer waste including rubber and thermal liquefaction of wastes at a temperature of at least 270°C at increased pressure (up to 6.1 MPa) in at least one solvent, i.e., alkyl benzene; separation of the liquid fraction and its distillation characterized in that in the course of thermal liquefaction of the waste an increased pressure is applied while after the distillation a part of the liquid fraction whose boiling point is at about 210°C, is introduced during the thermal liquefaction of a new batch to be processed, an additional component is added to the solvent at a mass ratio of at least 1:1 (See page 11, claim 1, lines 3-12). Letechin further discloses that the mass ratio of solvent to waste is selected within the range from 1:1 to 4.2:1 (See page 11, claim 2, lines 13-15).

Letechin does not specifically disclose catalytic reforming of a part of the liquid fraction boiling below 220°C. It is to be noted that the liquid boiling below 210°C is light fraction (which should necessarily comprise light naphtha) (See page 2, last paragraph). It is also to be noted that Letechin uses only a part of the liquid boiling below 210°C as the solvent in the next batch of thermal liquefaction. Thus, the remaining part of liquid boiling below 210°C (i.e., light naphtha) must be used elsewhere.

Wright discloses a process of naphtha reforming to produce a valuable gasoline product (See column 2, lines 7-13)

Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Letechin invention and use the fraction boiling below 210°C elsewhere, for example, in a catalytic reforming unit as disclosed by Wright, and making the fraction highly suitable for upgrading to a valuable gasoline product.

Letchin invention does not specifically disclose a fluid bed of the solvent.

Guffey discloses a process similar to Letchin for recycling plastic containing wastes including thermal liquefaction of the feed in a reactor containing an organic solvent (See column 2, lines 36-50). Guffey also discloses use of a continuous stirred tank reactor [41] (See figure 1) and further cites use of fluidized bed reactor in a similar process (See column 1, lines 50-57). Thus, Guffey's disclosure clearly indicates that any type of reactor, including a fluidized bed reactor as claimed, can be used in the process.

Therefore, it would have been obvious to one skilled in the art at the time of invention to use a fluidized bed reactor, as cited by Guffey, for an effective thermal liquefaction process. It is to be noted that in method claims, it is the overall method steps that are given patentable weight not the apparatus limitations thereof unless the apparatus limitations thereof materially alter the overall method. See *In re Leesona Corp.* 185 USPQ 156; *Ex parte Pfeiffer* 1962 CD 408; *Ex parte Kangas* 125 USPQ 419; *Ex parte Foreman* 1924 CD 47; *Ex parte Nelson et al.* 82 USPQ 115; *In re Winder* 1957 CD 175; *Ex parte Hart* 117 USPQ 193.

### ***Response to Arguments***

5. Applicant's arguments filed 02/12/2010 have been fully considered but they are not persuasive.

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6. In the arguments on page 5, the Applicant argues that the Official Action contains several technical errors. For example the Office Action states that the closest analogue discloses thermal liquefaction at a pressure up to 6.1 MPa while according to WO02/14412 for the thermal fluidifying, a high pressure not lower than 6.1 MPa is used. The liquid fraction with a boiling point not lower than 210°C is introduced into the solvent as an additional component, but Examination tells that the closest analogue discloses the use of a part of the liquid fraction with the boiling point below 210°C.

The Applicant's argument is not persuasive because Letechin discloses, "In this method, wastes from the production of synthetic rubber are used as the hydrocarbon solvent; they are taken in a weight ratio equal to 2-4:1, with respect to the starting rubber-containing wastes, and the process of thermal liquefaction is carried out at a temperature of 270-420°C and a pressure of 1-6 MPa. In addition, in one variation of the method, in order to carry out the process continuously, the fraction with boiling point above 200°C that is obtained after distillation of the liquid fraction is partially returned to the process as an additive to the starting hydrocarbon solvent....." (Page 2, lines 8-14, emphasis added). Obviously, Letechin is using a pressure in the reactor and the boiling point of the liquid used as solvent, in the claimed range.

7. In the arguments on page 6-8, the Applicant agrees that the method chosen as an analogue allows recycling rubber containing wastes also with producing technical carbon products and high-octane hydrocarbon fraction that was mentioned in the document W002/14412. However the Applicant argues that this method is inefficient in

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relation to rubber containing wastes, it was this fact that motivated the Applicant to develop the recycling method that will allow recycling this kind of waste with a higher efficiency. The Applicant agrees with the Examiner that the method of catalytic reforming is known from the prior art that is supported by the reference presented by the Examination. However the Applicant notes that in the reference a naphtha reforming is performed and the aim set in this document differs from the aim of the present invention. The same notes are made in respect of the pseudo-fluidized bed. Thus the document cited by the Examiner does not mention thermal liquefaction of rubber-containing wastes with solving the aim similar to the aim of the applied invention.

The Applicant's argument is not persuasive because the main reference, Letechin, discloses thermal liquefaction of rubber-containing wastes with similar aims as that of the claimed invention.

Letechin, does not specifically disclose catalytic reforming of a part of the liquid fraction boiling below 220°C.

However, Wright discloses a naphtha reforming process (See column 2, lines 7-13) using a hydrocarbon fraction this same boiling range as disclosed by Letechin.

Thus, it would have been obvious to one with ordinary skill in the art at the time of invention to modify Letechin invention by adding a naphtha reforming process to make an integrated process and use the fraction boiling below 220°C, as disclosed by Wright for an economical process.

Letchin uses a stirred tank reactor and does not specifically disclose a fluid bed reactor.

However Guffey discloses use of a continuous stirred tank reactor [41] (See figure 1) and also cites use of a fluidized bed reactor in a similar process (See column 1, lines 50-57).

Since Guffey recognizes the use of fluidized bed reactor in a similar process ,one with ordinary skill in the art could use any type of reactor, including a fluid bed reactor as claimed. Nothing unexpected is evidenced with respect to the overall process of recycling the waste rubber when employing the conventional fluidized bed of Guffey.

8. In conclusion, the claimed invention is *prima facie* obvious over Letchin in view of Wright and Guffey.

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PREM C. SINGH whose telephone number is (571)272-6381. The examiner can normally be reached on 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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